

LVI.—On *Hipposiderus diadema* and its closest Allies.

By KNUD ANDERSEN.

Hipposiderus diadema, Geoffroy.

Diagnosis (as compared with the three species described below).—Anteorbital width* of skull between 8.5 and 10 mm.; upper tooth-row (exclusive of incisors) 11.3–13.2 mm. Ears moderate: width 24–27.5 mm.; forearm 75.5–91 mm.

Range.—The Indo- and Austro-Malayan Subregions, exclusive of Betchian.

Hipposiderus diadema oceanitis, subsp. n.

Diagnosis.—Anteorbital width 8.5; upper teeth 11.3–12.1. Forearm 78.8–79.2.

Details.—Of all the local representatives of the *diadema* type, this form has the slenderest skull and the shortest tooth-rows. But in both of these respects it is almost, or completely, matched by the smallest individuals of *H. d. griseus*, from the Philippines, from which it, however, differs by the somewhat shorter forearm (78.8–79.2 mm., as against 83–88). The three specimens of *oceanitis* at my disposal evidently do not show the extremes of individual variation in size; the external dimensions of this form will, presumably, prove to be very much as in *H. d. pullatus* from New Guinea (forearm 75–81 mm.).

The third (external) supplementary leaflet is smaller than in the other forms of *diadema*, sometimes so small that it requires some attention not to be overlooked.

Type.—♂ ad. (in alcohol). Aola, Guadalcanar, Solomon Islands. Collected by C. M. Woodford, Esq. Brit. Mus. no. 88. 1. 5. 23.

Range.—Solomon Islands: Guadalcanar; Fauro.

Hipposiderus diadema griseus, Meyen.

Diagnosis.—Anteorbital width 8.6–9.2; upper teeth 12–13.2. Forearm 83–88.

Range.—Philippine Islands: Luzon, Catanduanes, Guimaras, Leyte, Mindanao (Mt. Apo; Zamboanga).

* The width of the facial portion of the skull, across the front margin of the orbits, immediately above the upper border of the infraorbital foramina.—All the measurements recorded in the "diagnoses" and in the table, p. 507, are of full-grown individuals. For explanation of some of the measurements, see Ann. & Mag. Nat. Hist. (7) xvi. (1905) p. 248, footnote.

Remarks.—8 adult and 5 young specimens*, from all the above-named islands of the Philippine group, have been examined. They all agree closely in cranial and external characters. In the general size of the skull and teeth, as well as in the anteorbital width, there is scarcely more than an average difference between this and the foregoing race, but the forearm is longer. Such at least is the case in all the specimens just referred to. But one adult example, from Zamboanga, collected by A. Everett, is quite extraordinarily small, the forearm measuring only 77·5 mm., the tail 35·8 (in all the others 43–54). The gap between this specimen and the whole of the other series (the young individuals not excepted) is so great that I can hardly believe it to belong to the same form. We find in the Philippines, in the same island, *Rhinolophus arcuatus* and *subrufus*, two distinct species differing in no important respect but size; in Java *Rh. minor* and *acuminatus*, differing much in the same way; in the Solomon Islands *H. d. oceanitis* and *H. dinops*, a small and a large representative of the same type of bat; it is therefore not improbable that in the Philippines there occurs a small and a large form of *H. diadema*. But to decide this more ample material is necessary.

Technical name.—The type of "*Rhinolophus griseus*" was from S. Matheo Cave, Luzon †. The figure (half natural size) gives a tolerably good representation of a *H. diadema*; the dimensions, as derived from this figure, are quite as in the Philippine series examined by me. The fur is stated to be "ganz aschgrau," which is certainly not the case in any specimen or any race of *diadema* I have seen; the ears are far too small, the supplementary leaflets not indicated. Notwithstanding these discrepancies there can, in my opinion, be no doubt as to the identification of Meyen's species.

Hipposiderus diadema pullatus, subsp. n.

Diagnosis.—Anteorbital width 9·2–9·5; upper teeth 11·8–12·5. Forearm 75·5–81.

Details.—The anteorbital width is slightly larger than in the foregoing forms, but there is no sharp line of separation, the maximum of *griseus* being equal to minimum of *pullatus*.

* Five of these thirteen specimens were kindly sent me for inspection by Mr. Gerrit S. Miller, Washington.

† F. J. F. Meyen, "Beiträge zur Zoologie, gesammelt auf einer Reise um die Erde," Nov. Act. Ac. Cæs. Leop.-Car. vol. xvi, pt. 2 (1833) p. 608, pl. xlv. fig. iv.—According to Peters (MB. Ak. Berlin, 1871, p. 316), the type specimen has been lost.

The general size is as in the Solomon race, markedly smaller than in *griseus*.

Type.—♂ ad. (in alcohol). Haveri, British New Guinea, 700 m., November 1893. Collected by Dr. Lamberto Loria. Presented by the Genoa Museum. Brit. Mus. no. 97. 8. 7. 9.

Range.—British New Guinea: Haveri; Chad's Bay.

Hipposiderus diadema vicarius, subsp. n.

Diagnosis.—Anteorbital width as in *H. d. pullatus*; upper teeth 12·1–13·2. Forearm 80·5–85·2.

Details.—Similar to *H. d. pullatus*, but on an average larger. The lateral vertical ridges on the front surface of the posterior leaf show some tendency to obliteration: in three out of five spirit-specimens from Sarawak they might by a hasty examination rather easily be overlooked.

Type.—♂ ad. (in alcohol). Niah Cave, Sarawak. Collected by A. Everett, Esq. Brit. Mus. no. 92. 9. 6. 23.

Range.—N. Borneo (Sarawak); S. Celebes (Kalao); Sumatra.

Remarks.—Six specimens from Borneo, one from Celebes, and one from Sumatra have been examined. The skull of the Celebes individual is in all essential points like those from Borneo (three skulls), only a trifle smaller, with somewhat smaller teeth; the nasal swellings as inflated as in any Bornean skull, the anteorbital width as great as in the largest of these latter. The Sumatra skull is slightly more slender than any from Borneo, the teeth somewhat smaller, the nasal swellings less inflated. These differences, very slight as they are, may eventually, when larger series from these islands are to hand, turn out to be quite individual.

Hipposiderus diadema, Geoffr., *typicus*.

Diagnosis.—Anteorbital width 9·5–9·8; upper teeth 12·3–13. Forearm 84·5–91.

Details.—This form is most closely related to *vicarius*, but as a rule larger, and with the facial portion of the skull slightly broader. The size of the teeth is the same as in the Bornean race. Only skins (six specimens) and skulls (five) have been examined.

Range.—Java, Timor.

Technical name.—The species was originally described from Timor*. There is a skin from that island in the

* Geoffroy Saint-Hilaire, "Sur un genre de Chauve-souris, sous le nom de Rhinolophes," Ann. Mus. d'Hist. nat. xx. (1813) pp. 263, 266, pl. vi.

British Museum, closely agreeing with Geoffroy's figure and description.

*Horsfield's Rh. nobilis**.—The cotypes † (two skins) of Horsfield's "*Rhinolophus nobilis*," from Java, are in the British Museum; both of them are young adults, *i. e.* evidently full-grown, but the epiphyses of the metacarpals not ankylosed and the teeth unworn. The skull of one of these cotypes, and the skulls of several other examples from Java, are as in the Timor bat. The forearm of five Java skins measures 85–91, of the Timor skin 84·5. It may mean (if it means anything) that, in a large series, Java specimens will turn out to be on an average larger than Timor specimens, in which case Horsfield's name will, of course, have to stand for the former race ‡.

Hipposiderus lankadiva, Kelaart.

Diagnosis.—Anteorbital width moderate: 9·2–9·8; teeth very large: upper row 14–14·7. Ears moderate: width about 23–24; size very large: forearm 88–94·8.

Details.—This species differs from *H. diadema* (all forms) in the following particulars:—

* Th. Horsfield, 'Zoological Researches in Java and the neighbouring Islands' (London, 1824), no. 7, letterpress (unpaged); figs. L, N, O, P, Q (head and dentition) on black-and-white plate (without number); coloured plate [8] (whole fig.).

† Nos. A and B in Horsfield's Cat. Mamm. Mus. East-Ind. Comp. (London, 1851) p. 35.

‡ *H. diadema* also occurs in the Malay Peninsula. The skull of an example (skin) in the British Museum, from Gunnong Pulai, Johore (collected by W. Davison, presented by A. O. Hume), has the anteorbital width 10 mm., a trifle larger than in the races described above; the size of the teeth (upper row 13 mm.) is quite as in an average form of *diadema*. I should have no hesitation in identifying this bat with Dobson's "*H. Masoni*," from Lower Burma, were it not for the reason that Dobson described this latter as having only one (central) vertical ridge on the front of the posterior leaf, whereas in the Johore specimen the lateral ridges are well developed (the other character of "*Masoni*" mentioned by Dobson, viz. a downward projecting process from the symphysis of the mandible, looks so strange that I suppose it may be an individual deformity in the only specimen known). The possibility is perhaps not excluded that Dobson had before him a specimen in which (as I have pointed out above to be sometimes the case in *H. d. vicarius*) the lateral ridges were markedly reduced, therefore easily overlooked. The length of the forearm of the Johore specimen and of the type of "*Masoni*" is almost exactly the same (in the former 86·8, in the latter 85). A safe identification of the Malacca form would require more material both from the Malay Peninsula (specimen "*c*" of *H. diadema* in Dobson's Catalogue (p. 137), from Penang, is a *H. armiger*) and from the type locality of "*Masoni*."

The skull is very large and heavily built (see measurements on p. 507), but the facial portion (antorbital width) comparatively narrow; nasal swellings well developed, inflated, making the upper surface of the facial portion very conspicuously convex*; portion between nasal swellings and sagittal crest convex or flattened, not distinctly concave, as in *H. diadema*; hinder part of orbits (temporal fossa) markedly broader; sagittal crest higher, more abruptly descending in front; mandible much longer, the rami higher. The teeth considerably larger.

The central projection of the posterior leaf is more prominent than in any other form of the *diadema* type, the upper border of the leaf, therefore, trilobate †, in so far recalling the shape of the posterior leaf in *H. armiger*. In *H. diadema* the central projection is but slightly prominent, the upper border almost evenly convex, as "a segment of the circumference of a circle" ‡. In one specimen of *H. lankadiva* there is a minute fourth lateral leaflet, external to the third; I have seen a similar individual aberration in two *H. d. vicarius* from Borneo.

Range.—Ceylon.

Technical name.—The type locality of *H. lankadiva* § is Kandy, Ceylon ||. Two skins from Dr. Kelaart's collection are in the British Museum, one of them marked (in Kelaart's handwriting?) "*H. lankadiva*; Kelaart; Kandy, 1850," and both of them quite as described above. But in his original description of *H. lankadiva*, Kelaart gives as length of the forearm 3 inches (76.2 mm.), of the third digit $1\frac{1}{4}$ inches (108 mm.), measurements which, if they are correct (and there is no reason to doubt them), would indicate a bat much inferior in size to any "*lankadiva*" I have seen. There is

* In this respect *H. lankadiva* is perfectly in accordance with the other bats described in the present paper; I emphasize this important point to prevent confusion with *H. armiger*, a species to which *H. lankadiva* bears a certain superficial resemblance in the general outline of the posterior leaf, but from which it differs widely in the shape of the facial portion of the skull. See the "General Remarks," below.

† The peculiar shape of the posterior leaf in specimens from Ceylon was pointed out by Blyth in 1863 (Cat. Mamm. Mus. Asiat. Soc. p. 26); it seems to have been overlooked by subsequent writers, who are unanimous in putting "*lankadiva*" down as a synonym of "*diadema*." The shape of the leaf is not always easy to ascertain in dried skins; it is quite pronounced in two spirit-specimens at my disposal.

‡ Dobson, Cat. Chir. Brit. Mus. (1878) p. 137.

§ "Lanka," I am informed on good authority, is a Hindu name of Ceylon. Is "-diva" the Sanskrit "deva" (cognate with Ζεύς (*Zeús*), δῖος, *deús*)?

|| E. F. Kelaart, 'Prodromus Faunæ Zeylanicæ' (Colombo, 1852), p. 19.

the possibility that two distinct forms of the *diadema* type, a small and a large, occur in Ceylon, in which case the name *lankadiva* belongs to the former. So long as this remains uncertain, I prefer to use Kelaart's name for the form here under consideration.

Hipposiderus euotis, sp. n.

Diagnosis.—Facial portion of skull broad: anteorbital width 10·3–10·6; teeth moderate: upper row 13·2–13·7. Ears large: width 29–29·8*; size rather moderate: forearm 84·5–89·2.

Details.—The skull of this species bears a certain resemblance to that of *H. lankadiva*; it is of about the same size, with very wide temporal fossæ (large zygomatic width), and with approximately the same shape and development of the sagittal crest; but the facial portion is considerably broader, the region between the nasal swellings and the sagittal crest distinctly hollowed out, as in *H. diadema*, not convex or flattened as in *H. lankadiva*. The teeth are markedly smaller than in this latter.

The shape of the posterior leaf is as in *H. diadema*.

Type.—Young adult (apparently full-grown), skin. Bat-chian. Collected by Dr. A. R. Wallace. Tomes Collection (unregistered).

Hipposiderus dinops, sp. n.

Diagnosis.—Facial portion of skull excessively broad: anteorbital width 11; teeth very large: upper row 14·6. Ears excessively large: width 32·5; size the extreme: forearm 96·5.

Details.—The skull is of the same size as in *H. lankadiva*, or rather larger, but the facial portion is much broader, the region behind the nasal swellings distinctly concave; the coronoid process of the mandible markedly higher and broader. The premolars and molars are as in *H. lankadiva*, but the upper canines much broader at base.

The lower leg is extraordinarily lengthened: 44 mm., as against 35·8 in the largest *H. lankadiva*. The tail, too, is markedly longer. The third leaflet external to the horse-shoe very small. The upper border of the posterior leaf as in *euotis* and *diadema*.

Type.—♀ ad. (in alcohol). Rubiana †, Solomon Islands. Collected by C. M. Woodford, Esq. Brit. Mus. no. 88.1.5.22.

* Measurements from two dried skins, therefore probably a little too small.

† A minute islet very near the western coast of New Georgia (see map in C. M. Woodford, 'A Naturalist among the Head-hunters,' London, 1890).

Colour.

The *style* of colour is, broadly speaking, the same in all the forms described above. There is some difference in details, and there seems to be a certain, though not very large, amount of individual variation.

This style of colour, in its most pronounced form, might be described as follows:—

Upperside of the body, anteriorly light-coloured, posteriorly dark-coloured; the two colours contrasting, and the line of demarcation between them sharp; the contrast is simply due to the fact that, in the hinder part of the upperside, the dark hair-tips are sufficiently long to completely cover the light bases of the hairs, in the front part very short or altogether wanting, exposing the light ground-colour; the dark-coloured part of the back corresponds to what I have called the “horseshoe-patch” in *Rhinolophus*. Base of hairs of upperside rather “ecru-drab” with a silvery tinge. Two round patches, whitish or yellowish, on each side of the body, at the shoulder-region, the one behind the other, rather close together. A longitudinal stripe, white or yellowish, bordering each side of the back, along the plagiopatagium. Underside a shade of “wood-brown.”

Putting aside some old skins, the colours of which may not be quite reliable, the chief differences between the species and subspecies, so far as they can be made out from the material to hand, seem to be these (all the skins described are of adult individuals):—

H. d. vicarius and *typicus*.—Hinder part of back “mars-brown” washed with “russet.” Patches and stripes well marked, sometimes tinged with yellowish.

H. d. griseus.—Not essentially different from *vicarius*; the shade of the brown colour of the hinder back varies somewhat, being sometimes darker, sometimes more tinged with russet.

H. d. pullatus (one skin only).—Back very much darker, approaching “seal-brown”; no contrast between anterior and posterior part of back. White patches and stripes very strongly marked*.

H. d. oceanitis (one skin).—Essentially as *pullatus*, but patches and stripes almost completely obsolete. Underside of body considerably darker.

H. lankadiva.—As *H. d. vicarius*, but hinder part of back

* This skin was obtained on July 10th; teeth somewhat worn; fur unabraded. Four spirit-specimens obtained in November seem to be of the same colour.

rather dark "Prout's brown." No patches; longitudinal stripe but very slightly indicated.

H. euotis.—Essentially as *H. d. vicarius*.

I have seen no skin of *H. dinops*.

Synopsis of the Species*.

| | |
|---|--------------------|
| Anteorbital width 8.5-10; ears moderate: width 23-27.5. | |
| Upper teeth 11.3-13.2; upper border of posterior leaf forming an arc of a circle: Indo-Austro-Malayan Subregions, exclusive of Batchian | <i>diadema</i> . |
| Upper teeth 14-14.7; upper border of posterior leaf trilobate: Ceylon | <i>lankadiva</i> . |
| Anteorbital width 10.3-11; ears large: width 29-32.5. | |
| Upper teeth 13.2-13.7; forearm 84.5-89.2; lower leg 36.8-37: Batchian | <i>euotis</i> . |
| Upper teeth 14.6; forearm 96; lower leg 44: Solomons. | <i>dinops</i> . |

General Remarks.

Common characters.—All the bats reviewed above have been called *H. diadema*. They have the following characters in common:—

Nasal swellings always distinctly inflated, the upper surface of the facial portion of the skull never quite flattened, as in *H. armiger* and its allies. p^3 (of course) and p_3 completely wanting. The cingula of p_2 and p_4 strongly in contact, rather often a little overlapping each other, very rarely (in two out of 33 skulls) separated by an extremely narrow interspace; the tendency to overlapping, and the rarity of the exceptions to the general rule, may be taken as evidences that p_3 has been lost for many generations of ancestors (compare the pronounced vacillation in this respect in those highly-developed species of *Rhinolophus* which have lost p_3). p^2 very small, and, with rare individual exceptions †, situated in the outer angle formed by the canine and p^4 , *i. e.* on the way towards complete obliteration. The upper canine and p^4 , as a general rule, very distinctly separated; quite often, however, the interspace is small or extremely small; very rarely the cingula are completely in contact ‡. p_2 somewhat reduced in size.

* On *H. Masoni* and *nicobarensis*, see the "General Remarks," below.

† In one skull, out of 33, p^2 is almost quite in row; the exception is a *H. d. vicarius* from Sumatra.

‡ The details, from an examination of 33 skulls, are these:—In 16 c and p^4 are rather widely separated; in 14 slightly or very slightly; in one almost in contact (*pullatus*); in one in contact on the one side (*griseus*); in one in contact on either side (*dinops*). The variation is quite individual, the extremes, or approximately the extremes, rather often occurring in individuals of the same subspecies (*griseus*. f. i.).

Third metacarpal longer than fourth, and this latter always considerably longer than fifth*. Second phalanx of third digit, with very slight variation, equal to the first phalanx †. Distal phalanges of fourth and fifth digits much shorter than the proximal phalanges ‡. Compare the wing-indices on p. 507.

Three supplementary leaflets on each side, external to the horseshoe; sometimes (*lankadiva*, *d. vicarius*) with a slight trace of a fourth, rarely with some reduction in the size of the third (*dinops*, *d. oceanitis*). Posterior leaf, with very rare individual exceptions, distinctly broader than the horseshoe. Its upper border forming an arc of a circle, rarely (*lankadiva*), by a stronger development of the median projection, distinctly trilobate. Three vertical ridges on the front face of the posterior leaf; the lateral ridges sometimes tending towards reduction (*d. vicarius*), sometimes completely wanting (*Masoni*, *nicobarensis*). No frontal pore.

They are all bats of considerable size, the forearm varying from 66 (*nicobarensis*) to 96.5 mm. (*dinops*). The sexes do not differ appreciably in size, nor is there any other secondary sexual differences.

Interrelations.—*H. diadema* is the least modified of the species: the facial portion of the skull is not excessively broadened, the teeth not very large, the ears moderate.

We have no means of deciding where this type of bat has originated, and how it has spread over the large area now occupied. But it is not unreasonable to suppose that the Philippine race, with its comparatively slender face, comes rather near to the ancestral species; and if it is true that these same islands are also inhabited by a markedly smaller form, we might with more confidence regard the Philippines as having, not improbably, been situated within the centre of dispersal. The equally slender face and rather small teeth in the extreme eastern form, *d. oceanitis* from the Solomon Islands, may, very likely, be due to slight degeneration of the type, if they are not indications that in this remote and isolated place some of the primitive characters of the type have been more faithfully preserved. But the only safe conclusion to be drawn from our examination of these bats

* Compare the genus *Rhinolophus*: third metacarpal always the shortest; in the more primitive species the fourth, in the more highly-developed the fifth, the longest.

† In primitive *Rhinolophi* always lengthened, in more differentiated species much lengthened.

‡ In *Rhinolophus* longer than, or much longer than, the proximal phalanges.

is that the Solomon Island and New Guinea forms are most closely related to each other, likewise the Philippine and the Celebes-Borneo-Sumatra forms, whereas the Java-Timor form is a trifle more aberrant from what we may well suppose to be the "ancient style."

In *H. d. vicarius* we found a certain tendency to reduction of the lateral ridges on the front of the posterior leaf. In *H. Masoni*, from Lower Burma, they have quite disappeared (provided Dobson's description of this bat is correct). *H. nicobarensis*, in which the same is said to be the case, would seem to be a pigmy form of this modification.

H. lankadiva is most closely related to *H. diadema*; the facial width is as in an average form of that species, but the skull is much more heavily built, the teeth markedly larger, and the shape of the posterior leaf a little aberrant*.

In Batchian (and neighbouring islands?) we find the *diadema* type modified into the large-eared and big-faced *H. eutis*, but still the teeth have retained their usual size. This form seems to lead to the very large, big-faced, large-toothed, large-eared, and exceedingly long-legged *H. dinops*, from the Solomon Islands †.

Thus the Solomon Islands, though being the extreme eastern limit for the group dealt with in this paper, are inhabited by two modifications of the same type of bat. But it must be remembered that these two forms (*H. d. oceanitis* and *H. dinops*) have been derived from two different branches of the fundamental type, the former from the "*diadema*" branch, the latter, probably, from the "*eutis*" branch, and that they therefore, very likely, have spread to these far eastern islands at different times and by different ways.

* *H. diadema* has been recorded from the Central Provinces of India (Dobson, Mon. Asiat. Chir. (1876) p. 200, nos. 293-296); I have seen no specimens from the Indian Peninsula.—Dobson also registers an adult female, in the collection of the Calcutta Museum, from Darjeeling (*l. c.* no. 292; see also J. Anderson, Cat. Mamm. Ind. Mus. Calcutta, 1881, p. 115). Is that a *H. diadema* (not a *H. armiger*)?

† The Solomon Islands are indeed peculiarly fertile in the production of giant species: *Mus imperator*, *Mus rex*, *Rana Guppyi*, to which is now added *Hipposiderus dinops*.

Table of Measurements.

| | <i>H. diadema.</i> | | <i>H. lankesteri.</i> | | <i>H. typica.</i> | | <i>H. lankesteri.</i> | | <i>H. evotis.</i> | | <i>H. dinops.</i> | |
|-----------------------------------|--------------------|------|-----------------------|------|-------------------|------|-----------------------|------|-------------------|------|-------------------|------|
| | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. |
| Ears, length | 28.8 | 30 | 27.2 | 30 | ... | ... | 26.8 | 27 | ... | ... | ... | ... |
| " greatest breadth | 27 | 27.5 | 25.5 | 27.5 | ... | ... | 23 | 24.2 | ... | ... | ... | ... |
| Horseshoe, greatest breadth | 9 | 10.3 | 9.7 | 10.2 | ... | ... | 9.3 | 10.2 | ... | ... | ... | ... |
| Posterior leaf, breadth | 10.8 | 11 | 11.1 | 12.2 | ... | ... | 10 | 11.3 | ... | ... | ... | ... |
| Forearm | 78.8 | 79.2 | 75.5 | 81 | 83 | 88 | 80.5 | 85.2 | 84.5 | 89.2 | 93.8 | 96.5 |
| 3rd metacarpal | 54.5 | 58 | 54.5 | 60.5 | 57.5 | 62 | 58.5 | 62.2 | 60.5 | 62 | 65.5 | 68 |
| 4th metacarpal | 53.8 | 56.5 | 52 | 59.3 | 56.5 | 61.7 | 56.8 | 60.2 | 58.5 | 60.2 | 63 | 67 |
| 5th metacarpal | 51.2 | 52.5 | 48.8 | 54 | 52.8 | 56.5 | 52.2 | 55.2 | 54.5 | 55.2 | 55 | 58 |
| Tail | 52.5 | 56.5 | 45.7 | 56 | 43 | 54 | 42.5 | 52 | ... | ... | ... | ... |
| Lower leg | 34 | 35.8 | 30 | 33.8 | 31.5 | 37 | 31.2 | 35.3 | 34.5 | 35.8 | 35.5 | 37.5 |
| Skull, total length | 30 | 31.5 | 30.2 | 31.8 | 30.8 | 32.1 | 31.2 | 33 | ... | ... | ... | ... |
| " mastoid width | 14.1 | 14.5 | 14.4 | 15 | 14.3 | 15.1 | 14.5 | 14.7 | ... | ... | ... | ... |
| " width of brain-case | 12 | 12 | 12.2 | 12.6 | 12 | 12.8 | 12 | 12.5 | 12.1 | 12.6 | 13.7 | 14 |
| " zygomatic width | 17.3 | 18 | 17.2 | 18.3 | 16.5 | 17.8 | 17.2 | 18.2 | 17 | 17.8 | 20 | 21 |
| " maxillary width | 11.2 | 11.6 | 11.6 | 12.1 | 11.1 | 12.1 | 11.8 | 13 | 11.5 | 12.6 | 13.1 | 13.7 |
| " anteorbital width | 8.5 | 8.5 | 9.2 | 9.5 | 8.6 | 9.2 | 9.2 | 9.5 | 9.5 | 9.8 | 9.2 | 9.8 |
| " across cingula of canines | 7.9 | 8.1 | 8 | 8.2 | 8 | 8.5 | 8 | 8.7 | 8 | 8.5 | 9 | 9.6 |
| Mandible | 21.5 | 22.4 | 21.7 | 23 | 22 | 23.5 | 22.2 | 23.3 | 22.3 | 23.2 | 25.7 | 27 |
| Upper teeth | 11.3 | 12.1 | 11.8 | 12.5 | 12 | 13.2 | 12.1 | 13.2 | 12.3 | 13 | 14 | 14.7 |
| Lower teeth | 12.9 | 13.3 | 13.2 | 13.9 | 13.2 | 14.9 | 13.8 | 14.8 | 13.7 | 14.8 | 16 | 16.8 |

Wing-indices.

| | Forearm. | 3rd metac. | III. ¹ . | III. ² . | 4th metac. | IV. ¹ . | IV. ² . | 5th metac. | V. ¹ . | V. ² . |
|--|----------|------------|---------------------|---------------------|------------|--------------------|--------------------|------------|-------------------|-------------------|
| <i>H. diadema, lankesteri, evotis, dinops.</i> | 1000 | 716 | 329 | 327 | 695 | 237 | 173 | 640 | 247 | 194 |